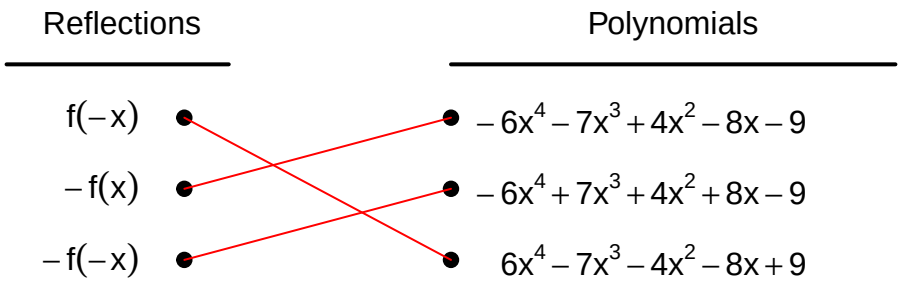
Name: Date:

Exam: Function Reflections (Solution version 9)

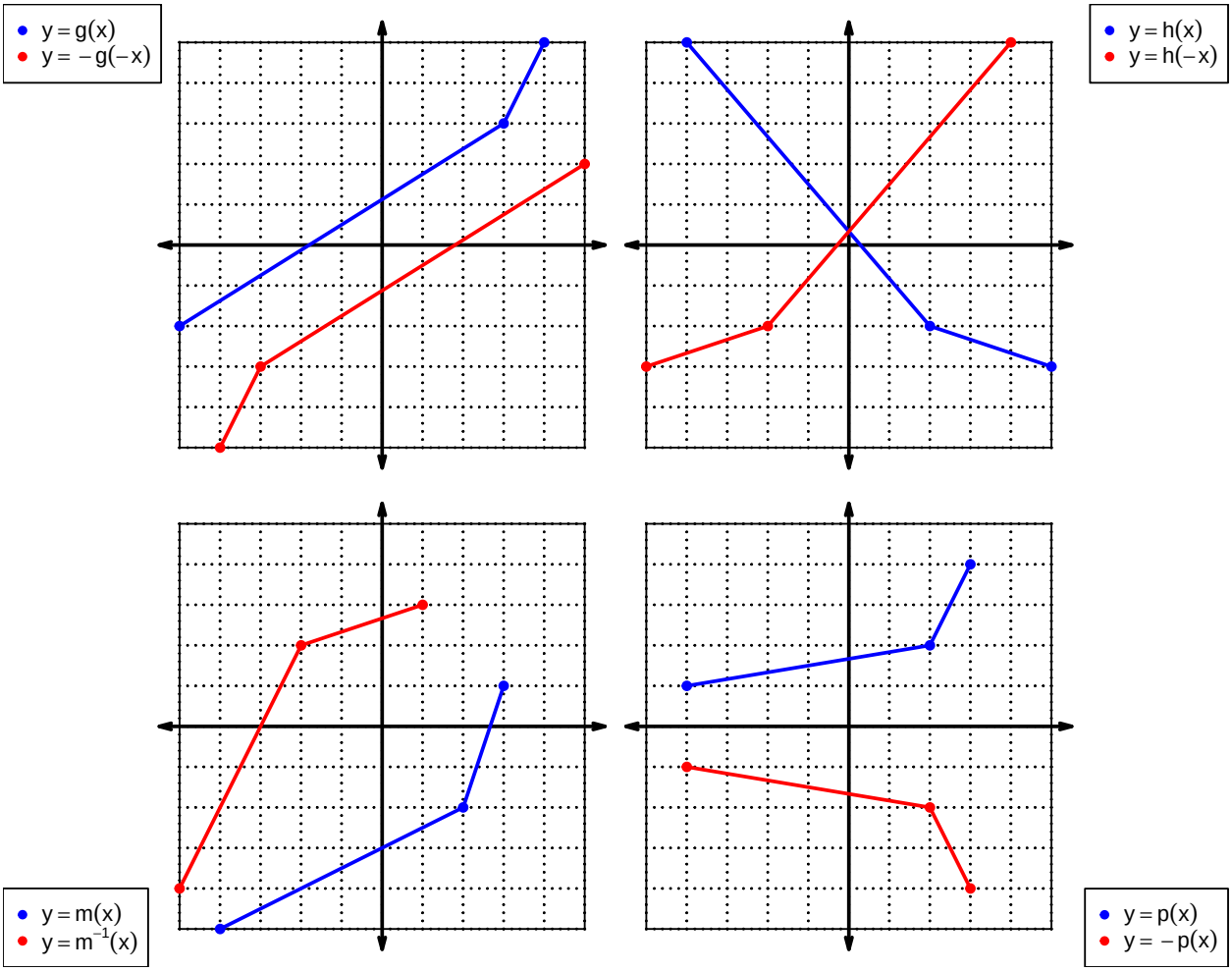
1. Let function f be defined by the polynomial below:

$$f(x) = 6x^4 + 7x^3 - 4x^2 + 8x + 9$$

Draw lines that match each function reflection with its polynomial:



2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



Exam: Function Reflections (Solution version 9)

For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	2	4	8
2	8	6	7
3	1	9	3
4	9	7	2
5	7	2	6
6	3	1	4
7	6	8	1
8	4	5	9
9	5	3	5

3. Evaluate $f(6)$.

$$f(6) = 3$$

4. Evaluate $h^{-1}(8)$.

$$h^{-1}(8) = 1$$

5. By filling more rows of the table, it is possible to make function h **even**. If that were done, what would be the value of $h(-7)$?

If function h is even, then

$$h(-7) = 1$$

6. By filling more rows of the table, it is possible to make function g **odd**. If that were done, what would be the value of $g(-5)$?

If function g is odd, then

$$g(-5) = -2$$

Exam: Function Reflections (Solution version 9)

7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) = -x^3 + x$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = -(-x)^3 + (-x)$$
$$p(-x) = x^3 - x$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -\left(x^3 - x\right)$$
$$-p(-x) = -x^3 + x$$

   c. Is polynomial p even, odd, or neither?

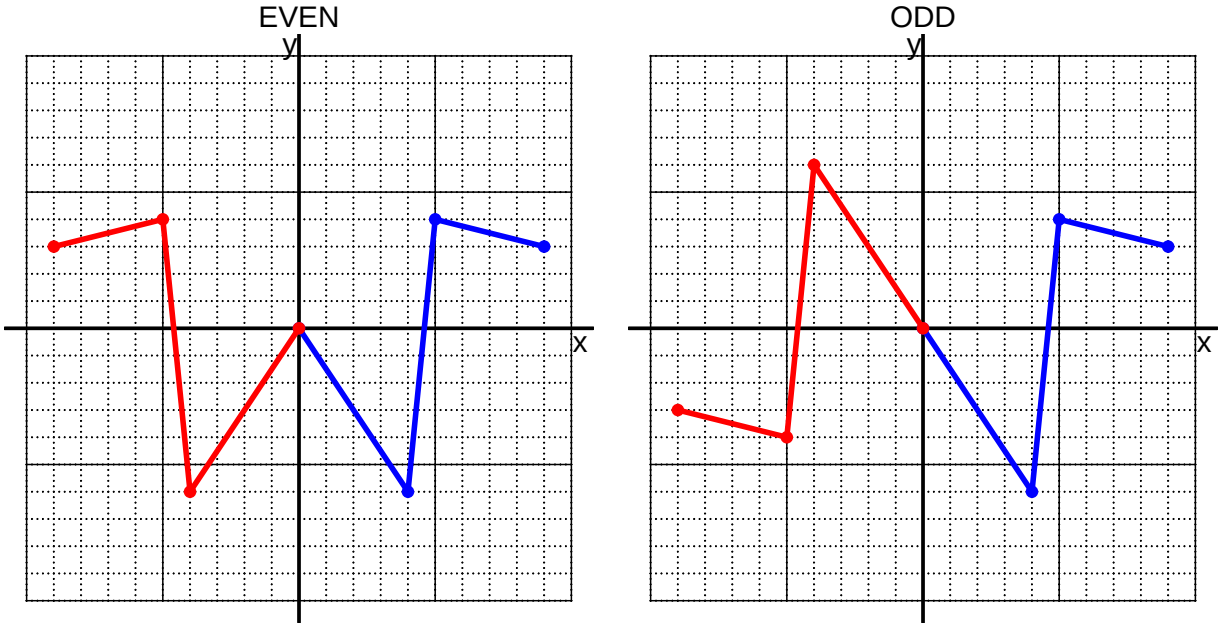
   odd

   d. Explain how you know the answer to part c.

   We see that $p(x) = -p(-x)$ for all x because $p(x)$ and $-p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an odd function.

Exam: Function Reflections (Solution version 9)

8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = 3x - 7$$

a. Evaluate $f(24)$.

step 1: multiply by 3
step 2: subtract 7

$$f(24) = 3(24) - 7$$
$$f(24) = 65$$

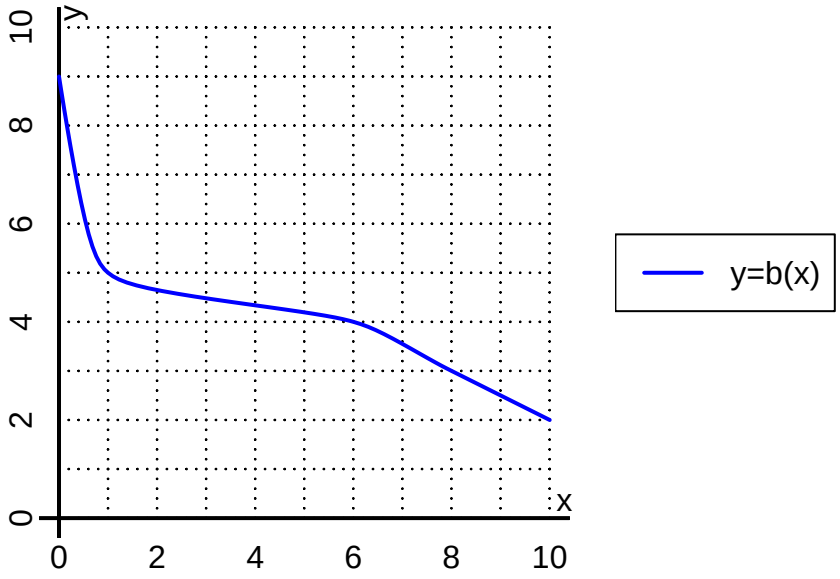
b. Evaluate $f^{-1}(20)$.

step 1: add 7
step 2: divide by 3

$$f^{-1}(x) = \frac{x+7}{3}$$
$$f^{-1}(20) = \frac{(20)+7}{3}$$
$$f^{-1}(20) = 9$$

Exam: Function Reflections (Solution version 9)

10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(1)$.

$b(1) = 5$

b. Evaluate $b^{-1}(4)$.

$b^{-1}(4) = 6$

Exam: Function Reflections (Solution version 9)

11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	4	-4	4	-4
-1	8	-8	-8	8
0	0	0	0	0
1	-8	8	8	-8
2	4	-4	4	-4

b. Is function f even, odd, or neither?

neither

c. How do you know the answer to part b?

Function f is neither because neither column $-f(-x)$ nor column $f(-x)$ matches column $f(x)$ exactly.